

PROVIDING PROCESSING LINES AND TEST DATA FOR THE GMES LAND MONITORING CORE SERVICE

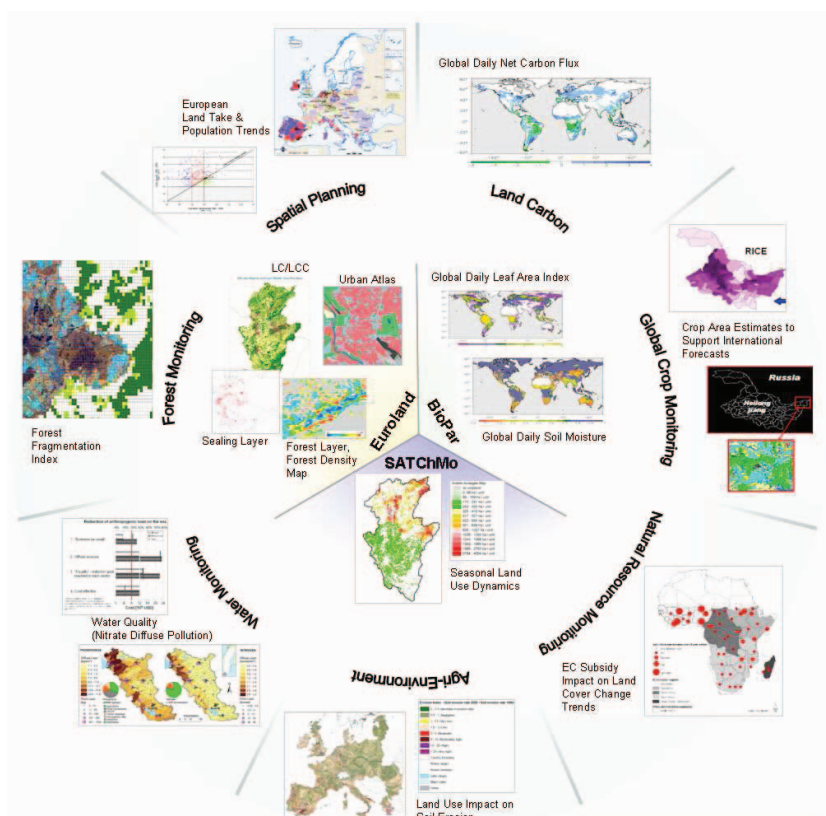
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ABSTRACT

GEOLAND 2 project is part of GMES and aims at preparing and validating pre-operational land monitoring information services like crop, forest, water or land carbon monitoring, spatial planning. To achieve these objectives the BioPar Core Mapping Service (CMS) will provide bio-physical maps on vegetation, water and radiation at various spatial and temporal scales. CNES, the French Space Agency, one of the 50 European partners of the Geoland 2 consortium, is developing new vegetation and water processing chains and will provide, beginning of next year, test data products for validation. The paper intend to describe processing chains and products characteristics and to give the first results on content and quality assessment of test data.

1 - GEOLAND 2 Project

GEOLAND 2 project is part of the GMES EU-lead initiative and intend to prepare, validate and demonstrate pre-operational service chains and products of the Land Monitoring Core Service (LMCS), and to propose its specific functional organization. The GEOLAND 2 consortium includes 50 European partners and is funded at 70% by the European Commission.



The aside figure presents the functional architecture of GEOLAND 2, composed of Core Information Services (CIS) and Core Mapping Services (CMS).

The 7 CIS use the CMS products to provide high level analysis maps on the following topics :

- Land Carbon
- Global Crop Monitoring
- Natural Resource Monitoring in Africe (NARMA)
- Agri-Environment
- Forest
- Water
- Spatial Planning

The 3 CMS provide global or local maps at various temporal scales in the following areas of interest :

- Euroland : Periodic land cover change and urban atlas
- BioPar : near real-time and off-line biophysical parameters
- SATChMo : Area frame sampling for seasonal monitoring and global land cover change

2 - BioPar Core Mapping Service

The BioPar CMS intends to provide new bio-physical parameter products with the following objectives :

1. to set-up an operational system, fully validated, developed according to industry standard, and that meets user's needs.
2. to ensure service continuity.
3. to improve quality assessment by combining technical and scientific validation, utility assessment and external expertise.

Product	NRT / Off-line	Spatial Resolution	Spatial coverage	Temporal Resolution	Sensor (back-up)
LAI, fCover, fAPAR, DMP, NDVI, Phenology	NRT	1 km	Global	10-days	VGT, MERIS (MODIS)
Time series of vegetation products	Off-line	4 km	Global	10-days	AVHRR + VGT
Climatology	Off-line	1 km	Global	Yearly	VGT, MODIS, AVHRR, MERIS
Burnt areas + seasonality	NRT	1 km	Global	Daily	VGT, AATSR
MERIS FR biophysical products	NRT	300 m	Europe	10-days	MERIS
HR biophysical products	Off-line	< 50m	Pilot Areas	2-3 months	SPOT
Land Surface Temperature, Downwelling Surface Radiation, Downwelling Longwave Radiation	NRT	~ 5 km	Global	3 hours	ΣGEO + AVHRR
Surface Albedo	NRT	1 km	Global	10-days	VGT
Surface Albedo	NRT	~ 5 km	Global	10-days	ΣGEO + AVHRR
Water Bodies + seasonality	NRT	1 km	Africa	10-days	VGT, MERIS
Soil Moisture + Freeze/Thaw	NRT	25 km	Global	Daily	ASCAT
Time series of soil moisture products	Off-line	25 km	Global	Daily	ERS1&2 Scatt

Table 1 : the BioPar products

The list of BioPar products with their characteristics is given in table 1. It covers near real time (NRT) and off-line products, at global and local scales, and covers three types of biophysical variables :

1. Vegetation products, in green, are based upon CYCLOPES products (cf figure 2), developed in the POSTEL centre of Medias-France, and combine NRT and long time series using AVHRR and VGT products.
2. Surface products, in brown, are based upon the ESA/GLOBCARBON and L3JRC projects and provide NRT global maps.
3. Water products (cf figure 3), in blue, are based upon VGT, MERIS, ERS and ASCAT data and provide NRT and off-line global maps.

CNES is involved in the products framed by a purple square, and is committed :

- To develop vegetation and water product processing lines.
- To produce vegetation and water test data for validation.
- To deliver the processing lines to other partners for near-real time and off-line production.
- To produce off-line historic vegetation and water products.

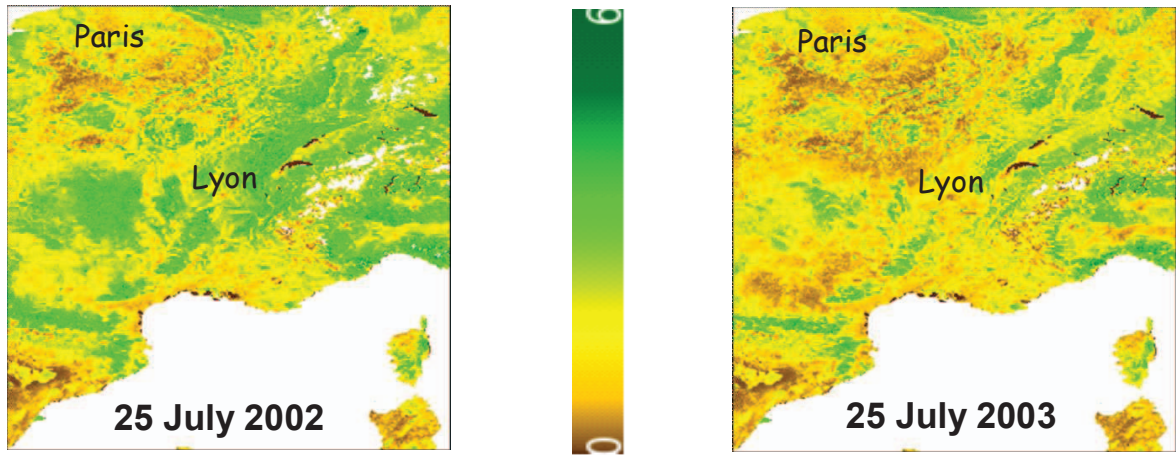
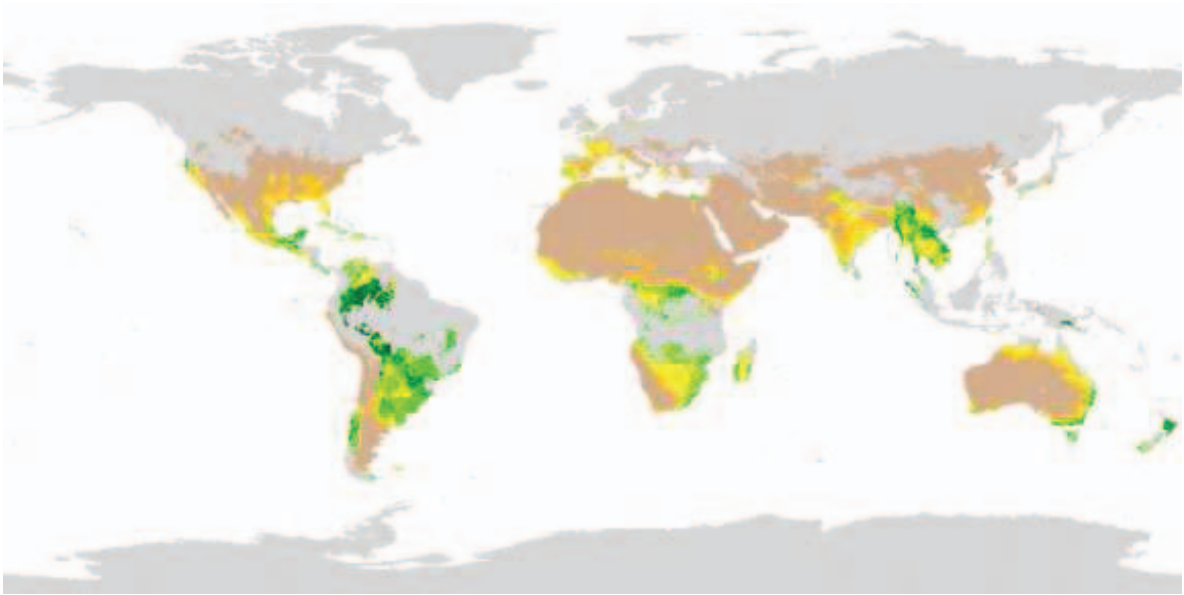


Figure 2 : Cyclopes Leaf Area Index (LAI) map

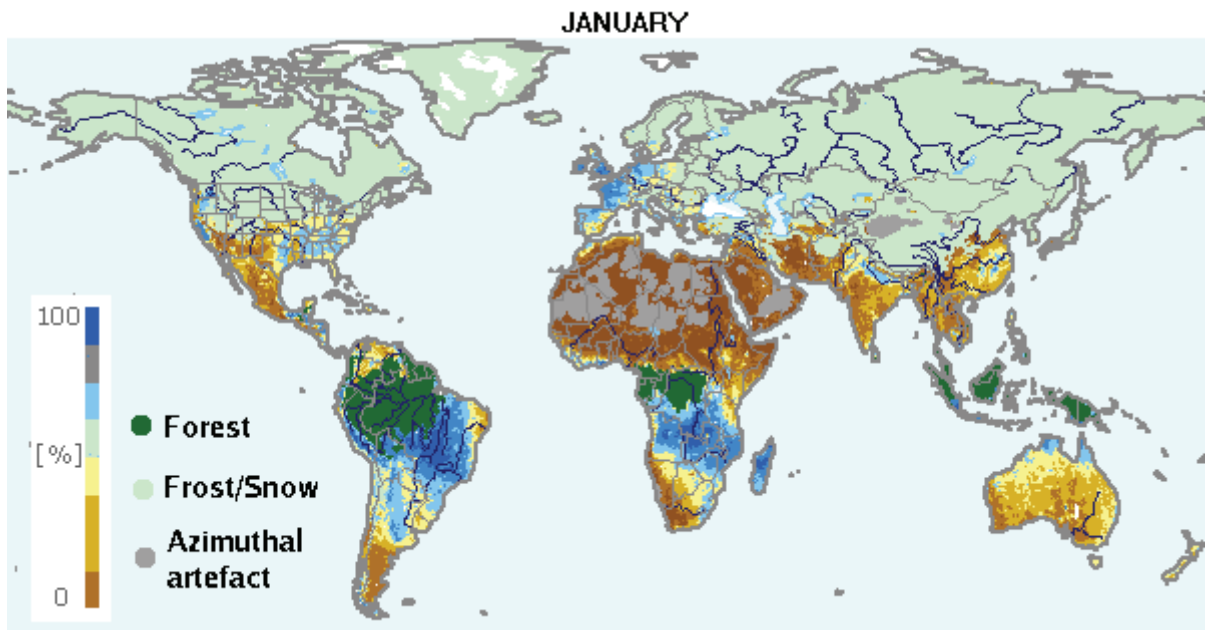


Figure 3 : Soil Water Index (1992-2000) derived from the ERS / Scatterometer

3 – CNES participation to BioPar / Geoland 2

The objective is to develop two versions of the processing lines until 2012, with a close validation loop with the users for the product improvement between the two versions. Table 2 shows the development plan for CNES processing lines.

		1/1/2009					1/1/2010					1/1/2011					1/1/2012																					
		O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O
Design	Requirement analysis																																					
Development	Vegetation processing line																																					
	Humidity processing line																																					
Test data	Vegetation product																																					
	Humidity product																																					
Production	Historic vegetation product																																					
	Historic humidity product																																					

Table 2 : CNES development plan

Since September 2008 CNES is involved in the BioPar Core Mapping Service for the development of five processing lines and the production of two products. Table 3 shows the sharing of definition, development and test data production, product validation and production activities among several European partners.

During end of 2008 and the first semester of 2009 CNES and the partners involved in the products definition have prepared the requirements set : product definition and characteristics and processing line requirements. The development of the processing lines has started in July and CNES will deliver the first version of processing lines in January to VITO and IM. A second version is foreseen in 2011.

Product	Type	Definition	Development and test data production	Product validation	Production
Vegetation parameters : LAI, fCover, fAPAR	NRT	INRA (F) HYGEOS (F)	CNES (F)	EOLAB (Sp) INRA (F), IGIK (PI)	VITO (Be)
Climatology	Off-line	INRA (F)	CNES (F)	EOLAB (Sp)	CNES (F)
Time series of vegetation products	Off-line	INRA (F)	CNES (F)	EOLAB (Sp)	VITO (F)
Soil Moisture + Freeze/Thaw	NRT	TU Wien (A)	CNES (F)	Meteo-France, ECMWF	IM (Pt)
Time series of soil moisture products	Off-line	TU Wien (A)	CNES (F)	Meteo-France, ECMWF	CNES (F)

Table 2 : CNES participation to BioPar

Another important activity at CNES is the production of test data with the processing lines, which will be delivered to the partners in charge of the product validation. The first test data set for the vegetation parameter and the soil moisture products will be delivered by CNES during the first trimester of 2010. Then the **first results** concerning these test products will be **available for the IGARSS 2010** symposium.

The paper will develop the characteristics of the vegetation and humidity products, show the content and area covered by the test data sets and give the results of these data set analysis and quality assessment.

4 - REFERENCES

Geoland 2 web site: www.gmes-geoland.info

Central access point to GMES Land monitoring geo-information : www.land.eu

CNES web site : www.cnes.fr

POSTEL web site : postel.mediasfrance.org